REMARKS

Claim 1 is pending in the application. Claim 1 stands rejected under 35 U.S.C. 112. The Examiner required addition of headings in the application and has required an abstract of the disclosure. Applicant has amended Claim 1 to be more definite. Applicant has amended the specification to include headings. An abstract of the disclosure has been added.

This Response and Amendment addresses items not raised in the Office Action. The application was filed with informal drawings. Applicant is amending the drawings by filing formal drawings. Additionally, Applicant now presents new claims 2-13. Claim 2 is dependent on Claim 1, and both recite a method for signal synthesis. Claims 3-9 recite a signal synthesizer. Claims 10-13 relate to a further combination, and claims 12 and 13 relate to a subcombination. Additional text is added to the specification. For the reasons specified below, this text is not new matter. Applicant has recently become aware of additional prior art. An Information Disclosure is filed herewith.

Rejection under 35 U.S.C. § 112

Claim 1 stands rejected under 35 U.S.C. § 112, 2nd paragraph as indefinite. Applicant has amended Claim 1 to more particularly point out the features of this method claim in method terminology. The rejection regards the lack of an antecedent for the recitation of "the periodic pattern generator." This recitation has been deleted, thus avoiding the issue. Applicant now recites providing a plurality, N, of periodic pattern signals g_1, g_2 through g_N. This recitation is supported in the application as filed at the beginning of the detailed description by the statement that A Periodic Pattern Generator 10 provides a plurality of periodic signals, where N is the number of outputs from the periodic pattern generator.

Next, the Examiner raises the issue of which frequency f_1 refers to. By confirming the recitation more closely to the specification as filed, Applicant has avoided this issue.

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Claim 1 as amended specifies that f_1 is the frequency of the periodic signals. Applicant has corrected the spelling of "thereby." It appears that the Examiner has taken a position that the expression "+/-" does not clearly convey the information that it is intended to be a "plus or minus" symbol. Applicant has therefore typed out in full the definition of "f_1 plus or minus f_2." It is therefore submitted that this issue is avoided.

The Examiner stated that Claim 1 would be allowable if rewritten to overcome the rejection under 35 U.S.C. § 112, 2nd paragraph. It is therefore submitted that the rejection has been met and that claim 1 is now allowable.

Allowability of Claims 2-15

Claim 2 is dependent on Claim 1 is submitted to be allowable by virtue of this dependency as well as by its further recitations.

Claims 3-15 relate to novel apparatus novel in its own right and also useful in connection with the practice of the method of Claims 1 and 2. The Examiner stated that the art of record art, while pertinent, is not to be relied on for a rejection. Massesnas et al disclose a method and apparatus to control phase in a phase locked loop. Bienz discloses a method and system for rational frequency synthesis. Wilke discloses a frequency synthesizer with at least one main phase Locked Loop. These references do not disclose the use of commutation sliders as recited in Applicant's apparatus claims.

Specification amendments and additions (location references are to the substitute specification)

Typographical errors are corrected. Additionally, additions are made which do not comprise new matter. These additions are explained as follows:

Page 6, line 16 – Page 7, line 24

Identity of the numeric subscripts already defined is more clearly pointed out. This paragraph explains in more mathematical detail that Equation 1 its representation as Unit

Fractions and the basic methods of deriving such unit fractions. Applicant believes that those skilled in basic number theory would have been able to supply or gain such insight and obtain the material provided herein by the Applicant without recourse to the inventive matter of the present application. Applicant cites within the body of this addition a reference to number theory literature relating to unit fractions.

The attached web page from http://www.mathpages.com/home/kmath340.htm illustrates the well-known relationship of Egyptian fractions to unit fractions discussed in this passage and the wide availability of literature in the area.

Page 8, lines 12-25

References to elements in Figures 5 and 6 are made with newly inserted number designators to match those provided in the amended formal drawings. An elaboration of the weighting filter and what was already apparent in these figures was provided for clarity and completeness. Applicant believes that those skilled in the art of phase locked loops and injection locked oscillators and their spectral 'purification' capabilities would have been able to recognize and arrive at the considerations that by this amendment were introduced by the Applicant.

Page 9, lines 8-14

The text and truth table inserted here merely provides more details on the implementation of the commutator cell of Figure 7, which details could have been easily supplied or derived by persons of skill in the art of logical control for multiplexers and commutators by observing Figure 7.

Page 9, lines 15-22.

This was done to clarify the context of Equation 2 based on the isomorphism between the field of the binary values 1 and 0 and the binary number field of +1 and −1. Again, Applicant submits that no new matter was introduced.
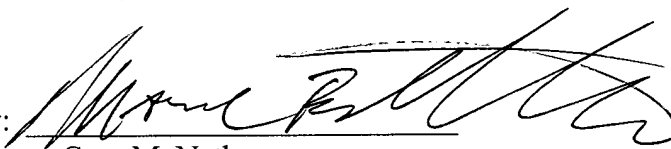
Page 10, lines 24 – page 11. line 15

This was done to clarify the ability to produce periodic patterns having better spectral properties through methods involving symmetric ternary valued signals as known in the art. The content of the shift register shown in Figure 8 would have already imparted to those skilled in the art the ternary nature of the reference signal for this phase locked loop application. References to elements in Figures 8 are made with newly inserted number designators to match those provided in the amended formal drawings. Again, Applicant submits that no new matter was introduced in this insertion.

Summarizing, Applicant has complied with the Examiner's requirements and has made amendment to avoid the rejection under 35 U.S.C. 112. Applicant has pointed out that the new claims distinguish over the art of record. In view of the foregoing amendment and the remarks in support thereof, Applicant respectfully submits that the Claims currently pending are patentable over the prior art and respectfully requests a Notice of Allowance therefore.
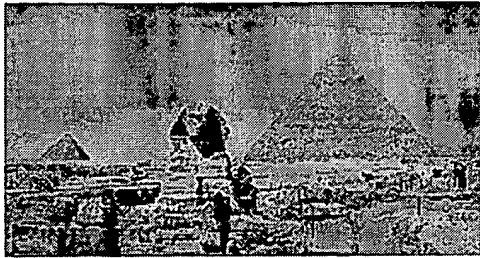
Respectfully submitted,

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Egyptian Unit Fractions

The representation of rational numbers as sums of unit fractions dates back to the time of the ancient Egyptians. Today this subject survives mainly as a source of mathematical puzzles and problems in abstract number theory, but the subject also has great historical and anthropological interest, since it sheds light on the thought processes of people who lived at the very beginning of recorded human history.

The articles listed below are primarily concerning speculation as to the possible methods that may have been used by the ancient Egyptians to construct their tables. Articles concerning the purely number-theoretic aspects of unit fractions are contained in the Number Theory section of this site.

    The Rhind Papyrus 2/n Table
    The Akhmin Papyrus
    Why Unit Fractions?

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